

Application Example

AC500

Scalable PLC
for Individual Automation

Connect AC500 V2.1 to
ACSM1 with Profibus DP using
Drive Manager

Connect

AC500 V2.1

To

ACSM1

With

Profibus DP



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1 Disclaimer

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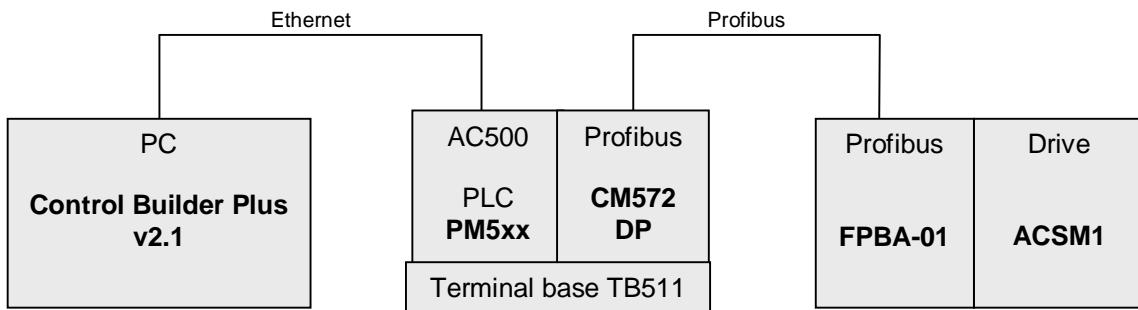
Der Nutzer ist für die ordnungsgemäße, insbesondere vollständige und fehlerfreie Programmierung der Steuerungen selbst verantwortlich. Im Falle der teilweisen oder ganzen Übernahme der Programmierbeispiele können gegen ABB keine Ansprüche geltend gemacht werden.

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2 Used equipment for example

2.1 Hardware overview



2.2 AC500

- AC500 PM583v2.1 ETH – Firmware V 2.1.3
- CM572 DP (PROFIBUS) – Firmware V 1.097
- ABB Control Builder Plus (PS501) V 2.1 includes CoDeSys V 2.3.9.22
- Terminal Base TB511 ..R0270

2.3 ACSM1

- ACS355 Motion – Firmware 1510
- ACS355 Motion – Drive Rating ID ACSM1-02A5-4
- FPBA-01 – Firmware 210B

2.4 Cables

- Standard Profibus cable with sub-D connectors. See manuals for pin assignments.
- Standard Ethernet patch-cable (RJ45)

2.5 Used documents:

Drive Manager:

Control Builder Plus v2.1 - Help
 → Contents
 → Drive Manager

CM579 Profibus coupler:

CoDeSys v2.3.9.22 - Help
 → Contents
 → Target System
 → Hardware AC500
 → Communication modules
 → CM572-DP



Note the AC500 help files are only included in CoDeSys help content when an AC500 project is open.

ACSM1 and FPBA-01

www.abb.com

- ⇒ Products and services
- ⇒ Drives (for electric motors)
- ⇒ Low Voltage AC Drives
- ⇒ Machinery drives
- ⇒ High Performance Machinery Drives
- ⇒ Manual
- ⇒ ACSM1 list of hyperlinks to all manuals:
 - ACSM1 Motion Control Program Firmware Manual
 - and
 - FPBA-01 PROFIBUS DP Adapter Module User's Manual

3 Configuration of ACSM1

To establish a fieldbus connection between AC500 PLC and an ACSM1 drive mount the FPBA-01 communication module on the drive. Set following Parameters with the “Drive Studio” software tool or with the Assistant Control Panel of the ACSM1 drive:

50	Fi el dbus	
50. 01	FBA ENABLE	Enabl e
...		

51	FBA SETTI NGS	
51. 01	FBA TYPE	PROFI BUS-DP
51. 02	FBA PAR2	2
51. 03	FBA PAR3	1500
51. 04	FBP PAR4	6
51. 05	FBP PAR5	0
51. 06	FBP PAR6	100
...		0
51. 27	FBP PAR REFRESH	REFRESH

The following parameters have to be set to map data to the Fieldbus variables for a cyclic data exchange that will be used later.

52	FBA DATA IN	
52. 01	FBA DATA IN1	4
52. 02	FBA DATA IN2	5
52. 03	FBA DATA IN3	6

53	FBA DATA OUT	
53. 01	FBA DATA IN1	1
53. 02	FBA DATA IN2	2
53. 03	FBA DATA IN3	3



Set Parameter 51.27 to REFRESH after all Parameters in group 51 have been set

Parameter 51.01: **Is set automatically by drive after installation of the communication module**

Parameter 51.02: The value 2 defines Profibus node address #2.

Parameter 51.03: The value 1500 defines the Profibus transfer rate of 1500 baud.

Parameter 51.04: The value 6 corresponds to PPO type 6. The PPO type that will be used will be defined by the Profibus master device.

Parameter 51.05: The value 0 refers to the PROFIdrive profile.

Parameter 51.06: Defines the T16 scale. The values will not be used with PROFIdrive profile.

Parameter 52.01: Maps the value of “STATUSWORD” to the first PZD variable that will be read from the PLC

Parameter 52.02: Maps the the value of “ACT1” to the second PZD variable that will be read from the PLC

Parameter 52.03: Maps the the value of “ACT2” to the third PZD variable that will be read from the PLC

Parameter 53.01: Maps the the value of “CONTROLWORD” to the first PZD variable that will be

Parameter 53.02: Maps the the value of “REF1” to the second PZD variable that will be send from the PLC

Parameter 53.03: Maps the the value of “REF2” to the third PZD variable that will be send from the PLC



You can find more Information about Profibus DP communication settings in ACSM1 parameter groups 50, 51 and 52 in the FPBA-01 communication module manual.

4 Configuration of AC500

Please start your Control Builder Plus v2.1 (PS501v2.1) Installation.

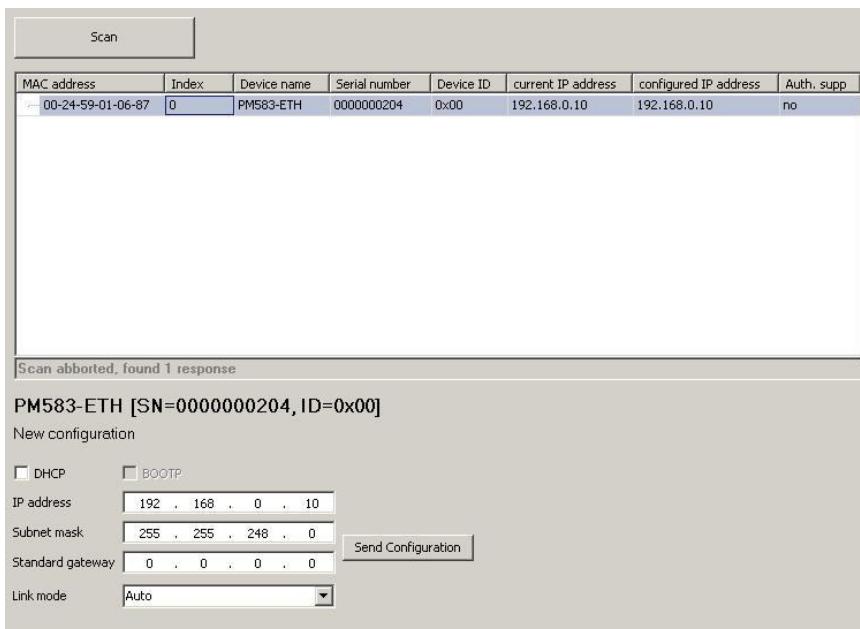
4.1 Set IP-Address of PLC

To set the IP-Address of your PLC select:

Control Builder Plus v2.1 \Rightarrow Tools  IP config tool:

Make sure that your PLC is powered and connected to your PC with an ethernet network switch or hub. You can also have a point-to-point connection with a standard Ethernet patch-cable.

Press "Scan" to search for connected AC500 PLCs on your network, select your PLC and change the IP-address if needed. Then press the "Send configuration" button to send new configuration data to your PLC. The PLC can be found during network scan when it is in run- or in stop-mode, but has to be in stop-mode while sending configuration data. After all data is transferred and processed it will restart automatically.



In case of an unused PLC its default address is 192.168.0.10 / 255.255.255.0. Even if you do not want to change this setting you have to send configuration once.

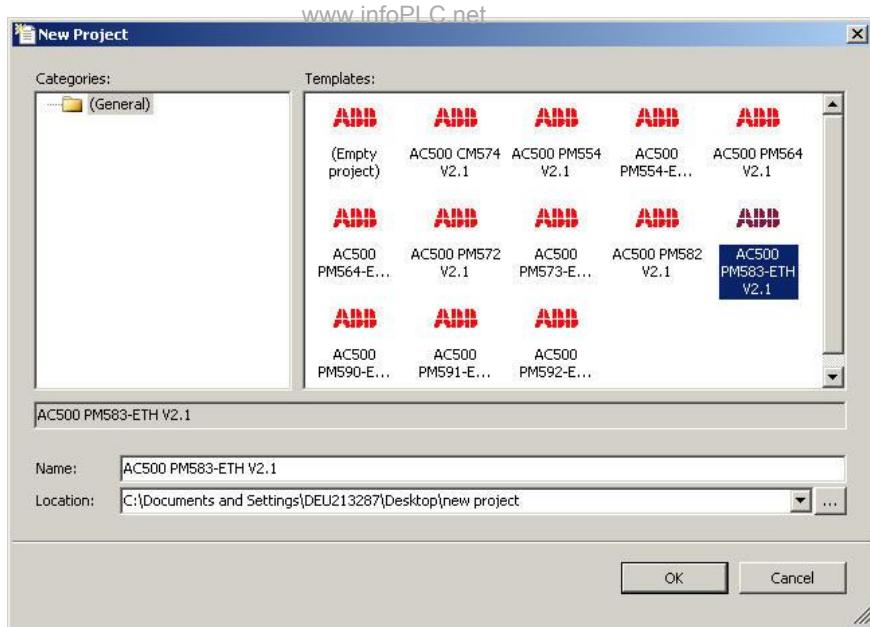
In order to login to the PLC later on, check if the IP address and subnet mask of your PCs Ethernet adapter matches to the one you have set for the PLC.

4.2 Create new AC500 project

To create a new project, please go to menu:

Control Builder Plus v2.1 \Rightarrow File  New Project...

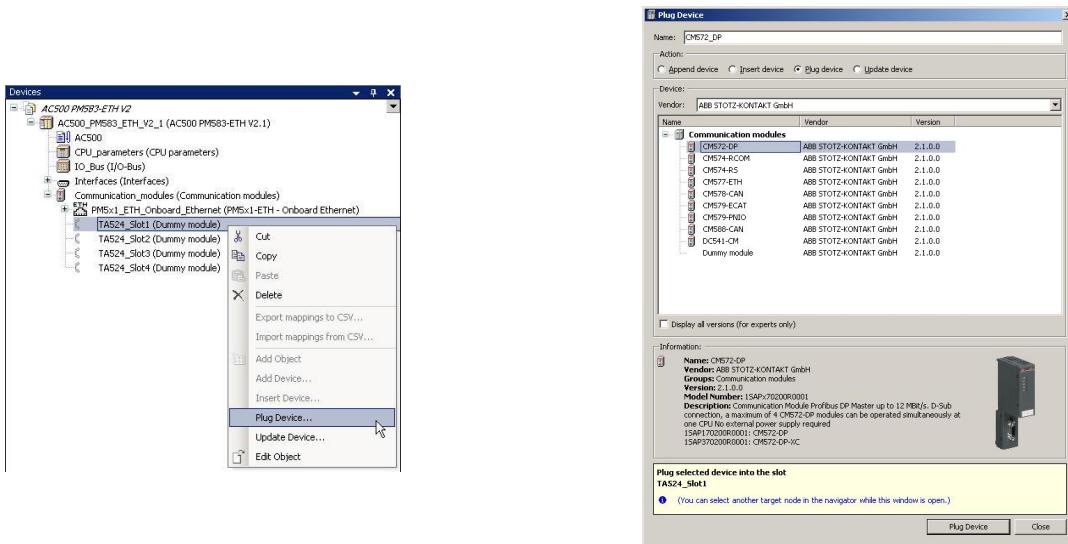
Then select a target that corresponds to your PLC.



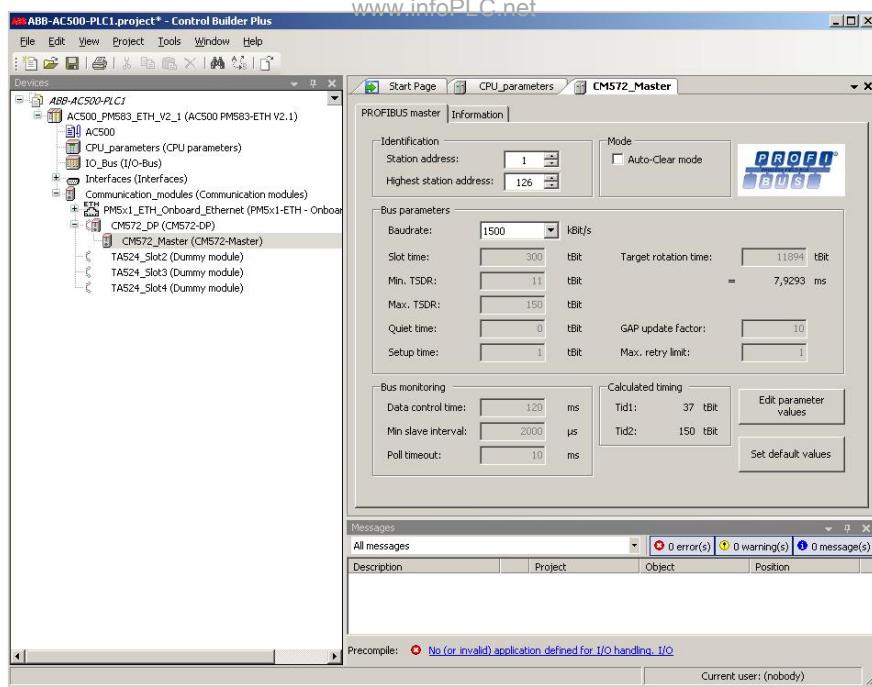
Once a project is made you still can change the type of PLC. Just select the PLC entry in the object tree, open the context menu and select "update device".

4.2.1 Add coupler CM572-DP into project

To insert the CM572-DP Profibus DP communication module right-click on the slot that carries the Profinet IO communication module and select "plug device". Then select the coupler and press "Plug Device" button.



To configure the CM572-DP Profibus module double-click on "CM572_Master (CM572-Master)" entry in your project tree.



In this example you can keep all default values, there are no changes to be made.



To remove a communication module. Open its context menu and select “plug device”. Then chose “Dummy module”.

4.3 Add the ACSM1 drive to the project

There are two different ways to integrate the ACSM1 with Profibus DP to your project:

1. Insert the FPBA-01 communication module to your project
2. Insert the complete ACSM1 drive to your project

Option 1 is for a standard profibus slave configuration where you can define network settings and the PPO type. Further more you can set the PKW and PZD mapping corresponding to the used PPO type.

Option 2 is recommended to use. It includes all settings of option 1, but it also enables you to make changes in the parameter settings of the drive itself without being on-site to the drive by using the Drive Manager.

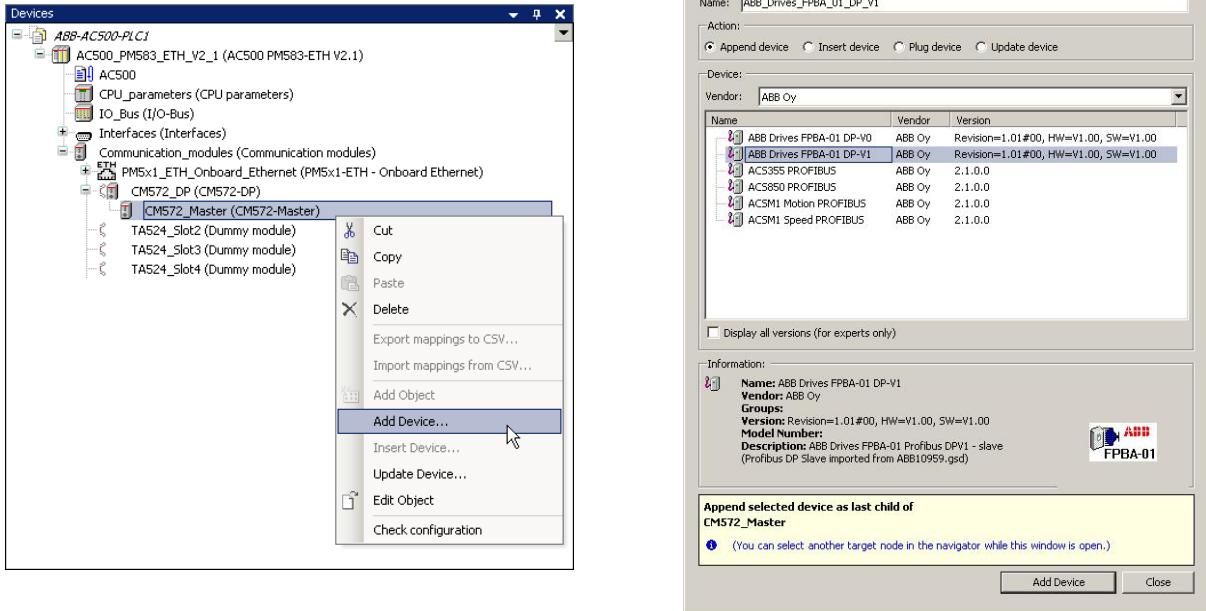
In the next subsections is an introduction to both options.



In Control Builder Plus v2.1 commonly used slave devices are already included. To use other devices for your project you have to install the GSD (Generic Station Description) file of the product into the device repository. Go to: CBPv2.1 => Tools => Device Repository

4.3.1 Option 1: Add FPBA-01

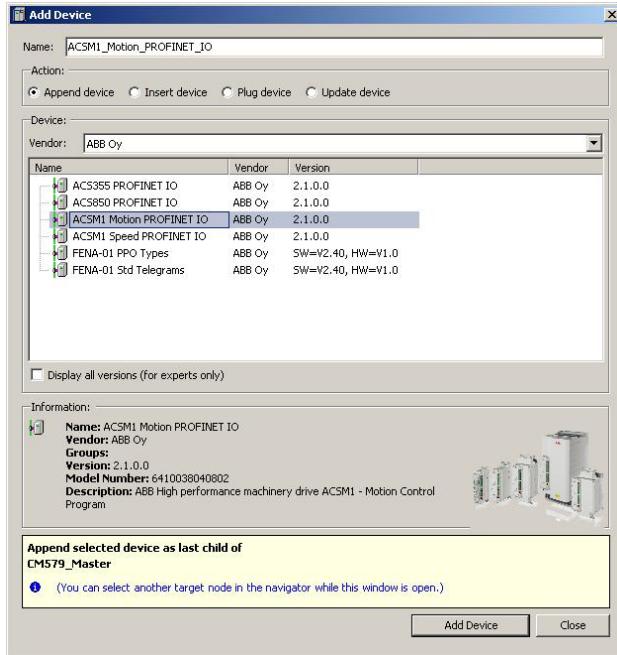
In the object tree open the context menu of the “CM579-PNIO-Master” object and select “Add Device”. Then chose “ABB Oy” as Vendor and select “ABB Drives FPBA-01 DP-V1” like in the figures shown below.



Open the context menu of the FPBA-DP module and select “Add device” to add PPO type 6 (0 PKW + 10 PZD) for a cyclic data exchange.

4.3.2 Option 2: Add ACSM1

Select the context menu of the CM579_Master entry and select “Add Device”. Then chose “ABB Oy” as Vendor and select “ACSM1 Motion PROFINET IO” as slave device.



Check or change the used firmware version of the drive by right-click on the “Drive Parameters xxxx” entry of the drive in the object tree and select “update”.

4.4 Configure PROFINET slave

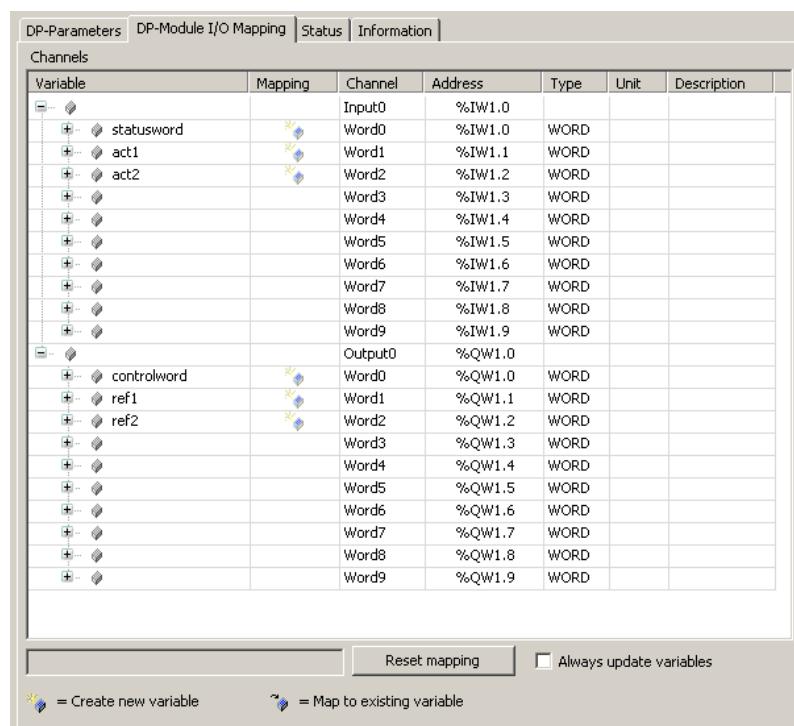
Depending on the option you have taken in the previous chapter either double-click on the "ABB Drives FPBA-01 DP-V1" or on the "ACSM1 Motion PROFIBUS" object to edit the Profinet slave. Please select die DP-Parameters tab. There you have to change the station address to the value "2".

Object	Tab	Parameter	Value / Description
ABB Drives FPBA-01 DP-V1	DP Parameters	Station address	Station address of the Profibus slave device. In this example "2" is used.
Or			
ACSM1 Motion PROFINET IO	DP Parameters	Station address	Station address of the Profibus slave device. In this example "2" is used.

According to the chosen PPO type you map cyclic data to your variables in CoDeSys.

Object	Tab	Parameter	Value / Description
PPO-06	DP-Module I/O Mapping	Input	Cyclic PZD data transferred from drive to PLC e.g. Statusword
		Output	Cyclic PZD data transferred from PLC to drive e.g. Controlword
		PKW xxx in	Acyclic PKW data transferred from drive to PLC for parameters
		PKW xxx out	Acyclic PKW data transferred from PLC to drive for parameters

Double-click on the "PPO Type 6" object and define cyclic data to be transferred between Profibus master and slave. As an example see the following figure.





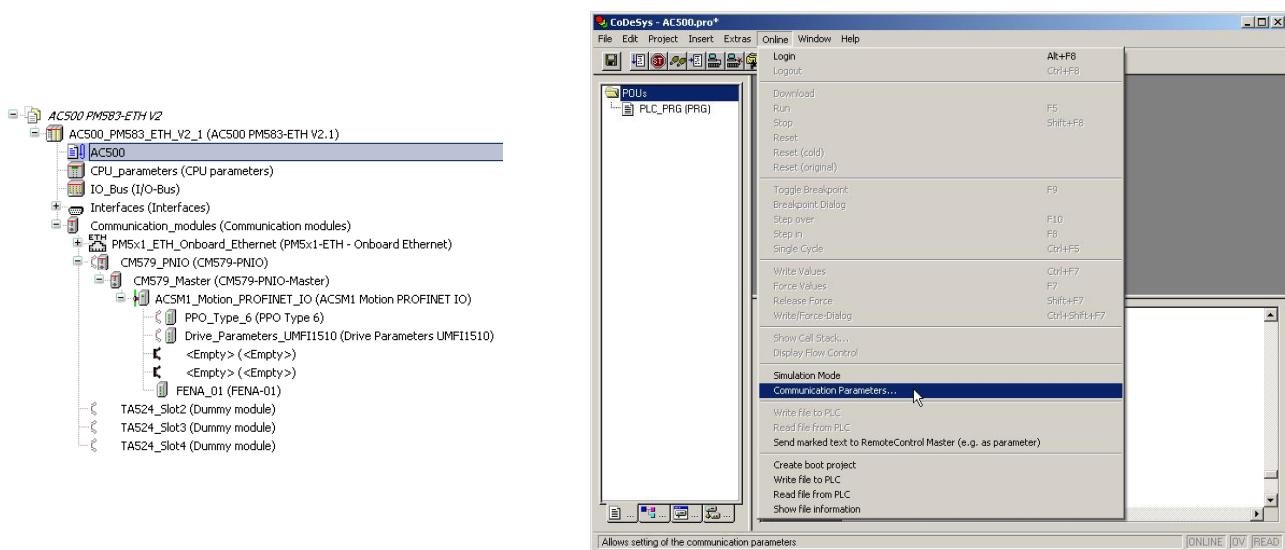
When you create new configuration data and login to the PLC, you will find the mapped variables in CoDeSys – Resources tab – Global Variables. See the next chapter.

4.5 Start PLC with new configuration data

CoDeSys

In Control Builder Plus double-click on the “AC500” entry of the object tree. This will create new configuration data and opens CoDeSys 2.3.9.22. You can also open the context menu of the “AC500” object and select “Create configuration data” only.

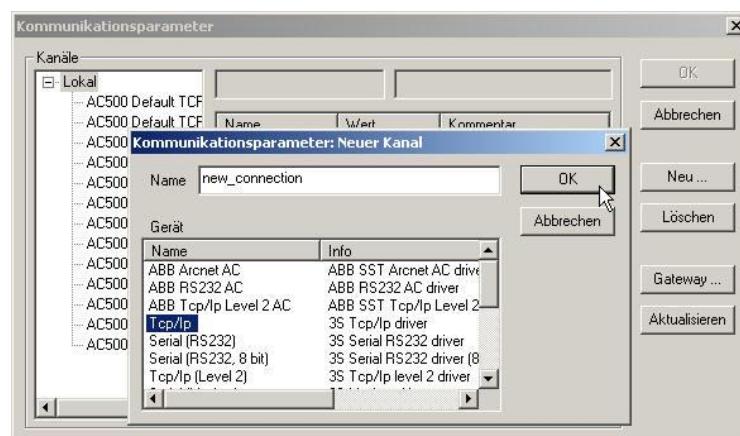
Confirm that you want to create new configuration data.



In CoDeSys select:

online ➔ Communication Parameters

Press “New ...” button, select the communication protocol “Tcp/Ip – 3S Tcp/Ip driver” and press OK





If you want to get access to a PLC through an other PLC please select the Tcp/Ip (Level 2) driver.

Enter the address you have chosen for your PLC in chapter 3.1. Set port to "1201" and Motorola bytorder "Yes". Then confirm the settings by pressing the OK button.



To login to your PLC with CoDeSys go to:

online ➔ Login

This will upload your configuration data to the PLC and gives you remote control. Select:

online ➔ Run

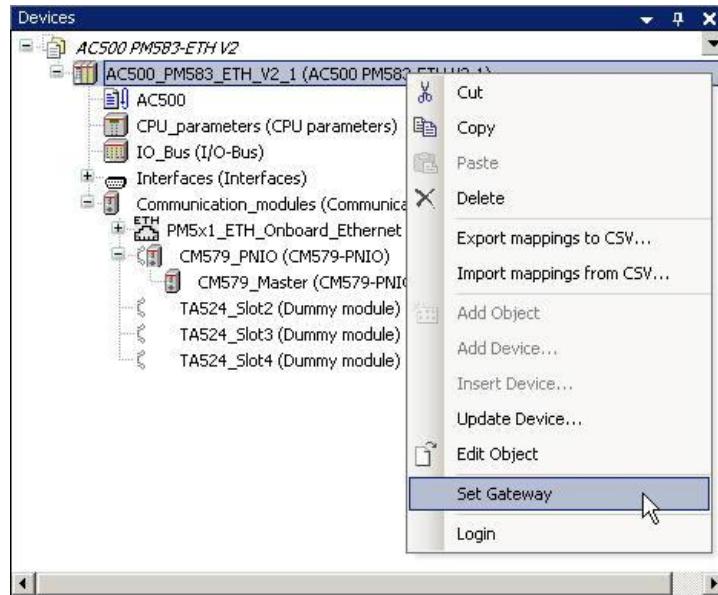
The Profibus DP Fieldbus is now operational.

5 Drive Manager in Control Builder Plus v2.1

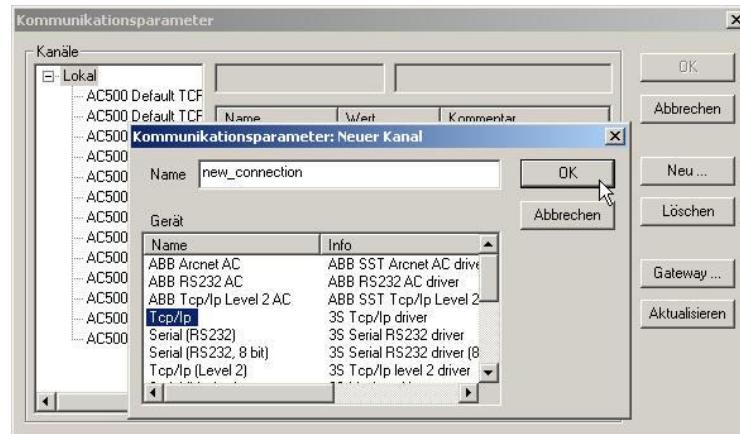
As a new feature Control Builder Plus v2.1 software has a Drive Manager included. To use this feature it requires to add “ACSM1 Motion PROFINET IO” as Profinet slave device, which is described as option 2 in the previous chapter.

5.1 Connect to PLC with Control Builder Plus

Switch back to Control Builder Plus and set up a second Ethernet connection. Right-click on the PLC entry to open its context menu. Then select “Set Gateway”



Press “New ...” button, select the communication protocol “Tcp/Ip – 3S Tcp/Ip driver” and press OK.



Enter the address you have already chosen for your PLC before. Set port to “1201” and Motorola bytorder “Yes”. Then confirm the settings by pressing the OK button.



After setting the connection parameters you can connect to your PLC with Control Builder Plus. Right-click on the PLC (e.g. "AC500 PM573-ETH V2.1") entry to open its context menu. Then select "Login".

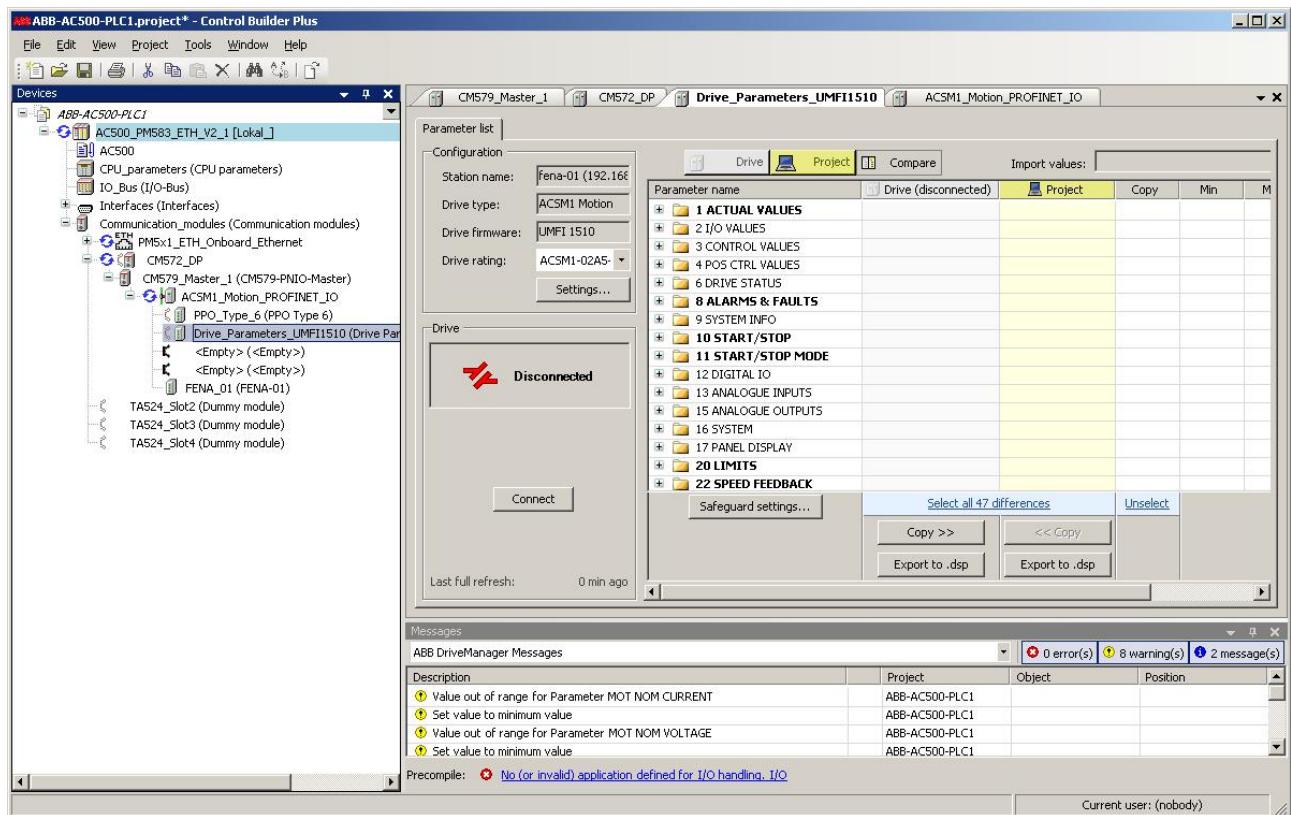


As long as you are logged in you will see this symbol in front of all items that have information transferred with the PLC

5.2 Start Drive Manager

In the object tree double-click on the object "Drive Parameters xxxx" as shown in the figure below to open the Drive Manager.

Make sure that your PLC is in run-mode. Then press the "Connect" button to connect to the drive. You can open multiple Drive Manager windows for different drives which should be configured at the same time.





Note that you can only connect to drive and read its parameters when the PLC is in run-mode.

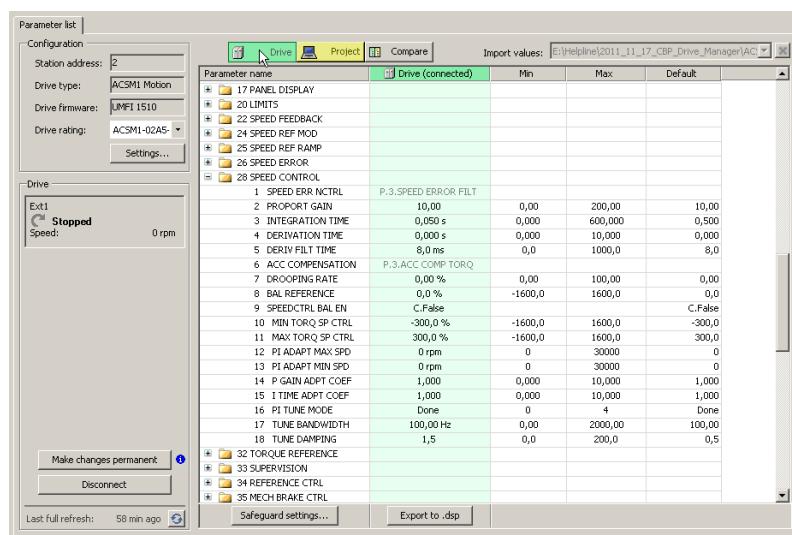
5.3 Edit drive parameters

When connected to the drive you can edit all parameters. To get a list of drive parameters click on the green “Drive” button.

After editing a parameter the value will be directly transferred to drive and becomes active except an additional refresh action is necessary.

Note, that all changes to the drive parameters are written momentary and will be reset by the next powerup. To make changed parameter values permanent you have to press the button “make changes permanent”.

You can save all active drive parameters in a file by pressing the “Export to .dsp” button.

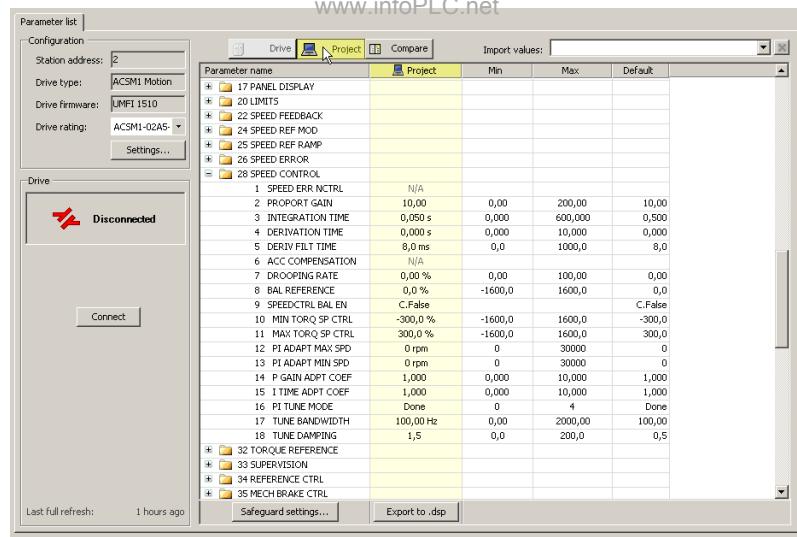


5.4 Drive parameters of the project

Press the yellow “Project” button to get a list of all parameters that will be stored in the project. You can also save these parameters in a file by pressing the “Export to .dsp” button.

To load parameters from a file click on selection box “import values” and open a file. Its values will be displayed beside the project values and enables you to select certain parameters you want to copy to your project.

Differences in the parameters of file and the project will be marked with bold letters.

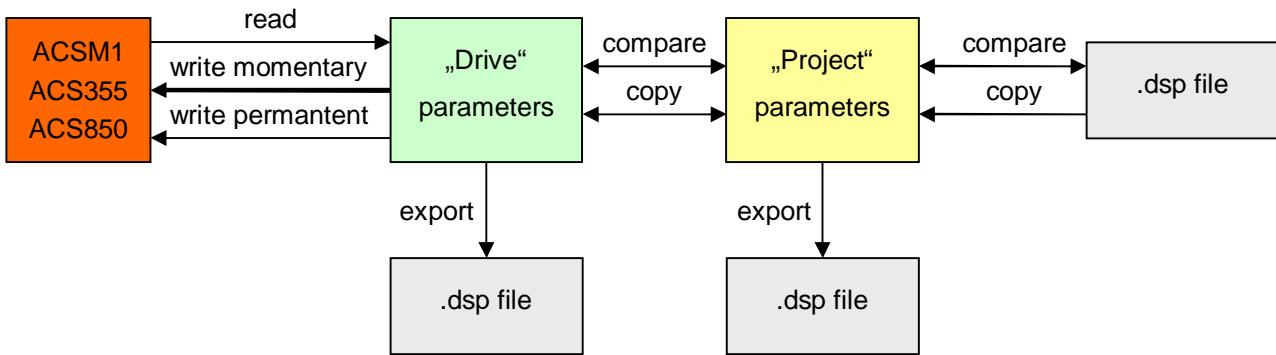


5.5 Compare parameters between drive and project

Press on the “Compare” button to show differences between the parameters of the project and the drive. You can copy parameters from the project to the drive and from the drive to the project.

If you want to write parameters from a file to the drive, you have to copy the parameters into the project first, then you can copy the parameters from the project to the drive. Then, they will be updated to the drive automatically.

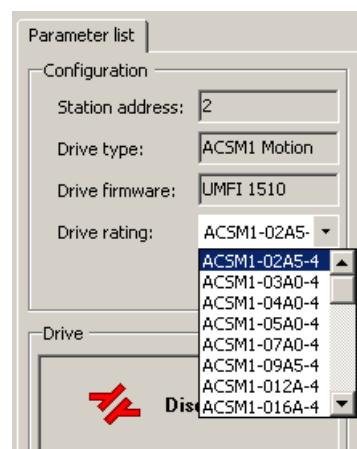
The following figure shows the available actions you can take to manage the drive parameters:



5.6 Drive Manager options

Drive rating

To configure the drive rating for the respective drive, use the Drive Manager window. tab Parameter list and item Drive rating. Drive rating affects to certain limits and setting range of the parameters.

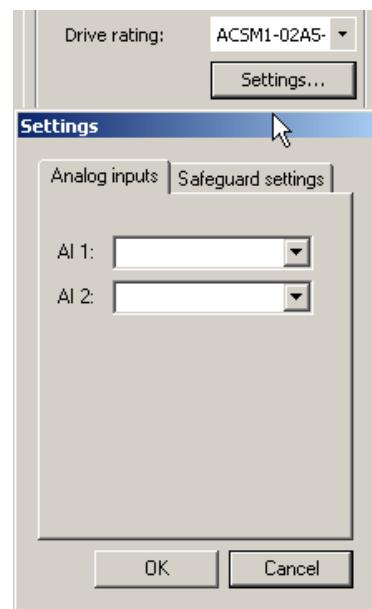


Drive Analog Input Settings

Configure the drive's analog input channel settings for current/voltage configuration based on the hardware (jumper/DIP switch) settings of the drive.

Based on the analog input settings, the drive parameters related to analog inputs will be updated automatically for correct units (mA/V). The user must re-check and verify that the analog signal parameter values are correct based on the change in the units.

The analog input settings can be done using Drive Manager by clicking on the Settings... button and then selecting the Analog inputs tab.



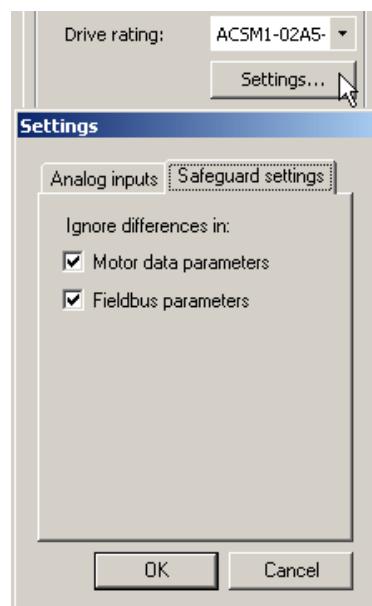
Drive Parameter Comparison Settings

You can define the comparison settings to be used when comparing the drive online parameters to the offline (project view) settings. With these settings you can define to ignore the differences in parameters related to Fieldbus settings and Motor Data settings. Both options' default settings are to ignore the respective parameters in the comparison.

If changes to these parameters are made accidentally, communication might be lost (fieldbus parameters) or a new ID run will have to be performed (motor parameters).

If you ignore the Motor data parameters using the settings, the comparison report will not give the difference in Motor data parameters in the online values and the offline values and the difference in the values cannot be downloaded to the drive.

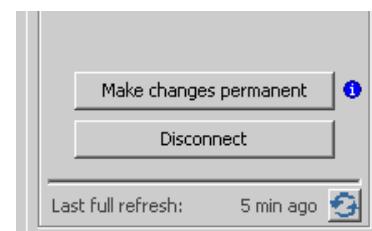
To set the comparison settings, use the Safeguard settings tab in settings window.



Refresh Parameters

To refresh the drive parameters completely, use the refresh button provided in the *Drive Manager* window. You can also see when the last complete refresh using this button has been performed.

To update the drive parameters of all the parameter groups or only a selected parameter group, right-click the parameter window inside the *Drive Manager* and select Update all parameters or Update all parameters in this group.



Doc. kind:		No. o. p.:
Helpline document		21
Title:		Lang.:
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